1: Microbiology. 2002 May; 148(Pt 5): 1291-303. Related Articles, Lir

The ARO4 gene of Candida albicans encodes a tyrosine-sensitive DAHP synthase: evolution, functional conservation and phenoty of Aro3p-, Aro4p-deficient mutants.

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The enzyme 3-deoxy-D-arabinoheptulosonate-7-phosphate (DAHP) synthase catalyses the first step in aromatic amino acid biosynthesis in prokaryotes, plant and fungi. Cells of Saccharomyces cerevisiae contain two catalytically redundai DAHP synthases, encoded by the genes ARO3 and ARO4, whose activities are feedback-inhibited by phenylalanine and tyrosine, respectively. ARO3/4 gene transcription is controlled by GCN4. The authors previously cloned an ARO3 gene orthologue from Candida albicans and found that: (1) it can complement a aro3 aro4 double mutation in S. cerevisiae, an effect inhibited by excess phenylalanine, and (2) a homozygous aro3-deletion mutant of C. albicans is phenotypically Aro(+), suggesting the existence of another isozyme(s). They no report the identification and functional characterization of the C. albicans orthologue of S. cerevisiae Aro4p. The two Aro4p enzymes share 68% amino a identity. Phylogenetic analysis places the fungal DAHP synthases in a cluster separate from prokaryotic orthologues and suggests that ARO3 and ARO4 aros from a single gene via a gene duplication event early in fungal evolution. C. albicans ARO4 mRNA is elevated upon amino acid starvation, consistent with t presence of three putative Gcn4p-responsive elements (GCREs) in the gene promoter sequence. C. albicans ARO4 complements an aro3 aro4 double mutat in S. cerevisiae, an effect inhibited by excess tyrosine. The authors engineered Deltaaro3/Deltaaro3 Deltaaro4/MET3p::ARO4 cells of C. albicans (with one wild-type copy of ARO4 placed under control of the repressible MET3 promote and found that they fail to grow in the absence of aromatic amino acids when ARO4 expression is repressed, and that this growth defect can be partially rescu by aromatic amino acids and certain aromatic amino acid pathway intermediate: It is concluded that, like S. cerevisiae, C. albicans contains two DAHP synthase required for the first step in the aromatic amino acid biosynthetic pathway.

1: K01989. E.coli aroF gene ...[gi:145361] Links

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LOCUS       ECOAROF                 1071 bp    DNA     linear   BCT 26-APR-1993
DEFINITION  E.coli aroF gene for DAHP synthase (Tyr), complete coding sequence.
ACCESSION   K01989
VERSION     K01989.1  GI:145361
KEYWORDS    3-deoxy-D-arabinoheptulosonate-7-phosphate synthetase; aroF gene.
SOURCE      Escherichia coli
  ORGANISM  Escherichia coli
            Bacteria; Proteobacteria; Gammaproteobacteria; Enterobacteriales;
            Enterobacteriaceae; Escherichia.
REFERENCE   1  (bases 1 to 1071)
  AUTHORS   Shultz,J., Hermodson,M.A., Garner,C.C. and Herrmann,K.M.
  TITLE     The nucleotide sequence of the aroF gene of Escherichia coli and
            the amino acid sequence of the encoded protein, the
            tyrosine-sensitive 3-deoxy-D-arabino-heptulosonate 7-phosphate
            synthase
  JOURNAL   J. Biol. Chem. 259 (15), 9655-9661 (1984)
  MEDLINE   84264621
   PUBMED   6146618
COMMENT     Original source text: E.coli DNA, clone pKB45.
            In the features table DAHP synthase =
            3-deoxy-D-arabino-heptulosonate 7-phosphate synthase.
FEATURES             Location/Qualifiers
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     CDS             1..1071
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ORIGIN      26 bp upstream of RsaI site; about 56.7 min on K12 map.
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      121 cgtaaaagca tttcagatat tatcgccggg cgcgatcctc gtctgctggt agtatgtggt
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      241 gccgcagagg tcagcgatag cctctatctg gtaatgcgcg tctattttga aaaaccccgt
      301 accactgtcg gctggaaagg gttaattaac gatccccata tggatggctc ttttgatgta
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